

## ORIGINAL ARTICLE

# Polyp prevalence at colonoscopy among Nigerians: A prospective observational study

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## Abstract

**Background:** This study was aimed at identifying the prevalence, distribution, and clinicopathologic characteristic of colonic polyps among Nigerians undergoing colonoscopy at the Obafemi Awolowo University Teaching Hospitals complex, Ile-Ife, Nigeria. We also determined the polyp detection rate (PDR), polyps per colonoscopy (PPC) and adenoma detection rate (ADR).

**Materials and Methods:** This is a prospective study of all colonoscopy examinations performed at the endoscopy unit of our hospital from January, 2007 to December 2013. The patient demographics, indications for colonoscopy, colonoscopic findings, number of the polyps, their sizes, possible risk factors in the individual case histories, and histopathological characteristics of the polyps.

**Results:** During the study period, a total of 415 patients met the inclusion criteria and only 67 out of these had colonic polyps. The overall PDR was 16.1%. The age ranged was 2-87 years with a median of 57 years. Forty-three (64.2%) patients were 50 years or above and there were 40 (59.7%) males. Thirty-three (49.3%) patients were referred as a result of lower gastrointestinal bleeding, 14 (20.9%) for colorectal cancer (CRC) and 13 (19.4%) for routine screening. Thirty-nine (58.2%) patients had the polyps at the rectosigmoid region of the colon, 17 (25.4%) had the polyps located proximal to sigmoid colon and 11 (16.4%) patients had multiple polyps involving both segments. Adenomatous polyps was the most common (28 [47.5%]) histopathological finding of which two patients had adenomatous polyposis. Other findings include inflammatory polyps in 17 (18.8%) patients, 5 (8.5%) patients each had hyperplastic and malignant polyps, while 4 (6.8%) patients had juvenile polyps. The ADR was 6.8 and the PPC was 0.2. Statistically, patients 50 years and older were more likely to have adenomatous and hyperplastic polyps than those younger than this age ( $P = 0.010$ ).

**Conclusion:** We conclude that polyps are probably not as rare among black Africans especially when they are above 50 years. Our histopathological finding of adenomatous change in a good proportion of the detected polyps show that they are likely to be associated with CRCs in our compatriots and as such we would recommend a routine screening colonoscopy for Nigerians aged 50 and above.

**Key words:** Adenoma, hyperplastic, inflammatory, Nigeria, polyps, prevalence

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## Introduction

The significance of colonic polyps, especially the adenomatous polyps, comes from the fact that it is generally accepted to be a precursor to colorectal cancer (CRC). Current evidence from Western countries is that over 95.0%

of CRCs arises from colonic polyps.<sup>[1]</sup> Most autopsy and colonoscopy series from developed countries show about 30% to 50% of the individuals had colonic polyps with about 5-10% of persons of age 50 and above harboring advanced

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colonic neoplasm.<sup>[2-6]</sup> Hence, early detection should lead to a higher cure rate, and indeed, up to 90.0% of deaths can be prevented by the timely removal of the precancerous polyps.<sup>[6,7]</sup> However, previous report from sub-Saharan African countries showed that colonic polyps are rare in the African colon.<sup>[8,9]</sup> The rarity of colonic polyps was suggested to be the reason for the observed low incidence of CRC in sub-Saharan Africa, except South Africa.

Recent evidence, however, from most sub-Saharan African countries had shown a sharp rise in the incidence of CRC.<sup>[10,11]</sup> Reasons adduced for this rise include the adoption of westernized diet, increased greater awareness of CRC, improved diagnostic services and better functioning cancer registries. One of the diagnostic facilities which have improved diagnosis of CRC is colonoscopy. Colonoscopy has also allowed early detection and timely removal of premalignant polyps.

Currently, no information is available on the prevalence of polyps, especially adenomatous polyps among Nigerians. Such a study will help to ascertain if the apparent current increase in the incidence of CRC is associated with concomitant increase in the incidence of colonic polyps. This need motivated this study. This study is, therefore, aimed at identifying the prevalence, distribution and histopathological characteristic of colonic polyps among Nigerians undergoing colonoscopy at Obafemi Awolowo University Teaching Hospital complex, Ile-Ife, Nigeria. We also assessed the polyp detection rate (PDR), polyps per colonoscopy and adenoma detection rate (ADR).

## Materials and Methods

### Study population

We conducted a single-institution, prospective cross-sectional study of consenting consecutive patients who had colonoscopy done at the Endoscopy Unit of Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife, Nigeria from January 2007 to December 2013. These patients were referred from the General Surgical, Gastroenterology, and General Outpatients Unit of the hospital. Similarly, patients were also referred from surrounding tertiary, secondary and private facilities. Patients who had incomplete procedure due to any cause were excluded from the cohort. Patients who had previous colonic resection were also excluded. The research was approved by the Hospital Research and Ethic committee of Obafemi Awolowo University Teaching Hospitals Complex at the beginning of the study.

Most (95%) of the colonoscopies were performed by the first author (AOI) by using white light colonoscopes Pentax FC 38 LW. Bowel preparation was performed in most of the patients by having the patients ingest on the penultimate day

4 L of polyethylene glycol lavage solution and low-residue diet preceded by the use of laxative taken the previous 2 days. Patients with features suggestive of partial intestinal obstruction had water enema. Few of the patients also had phosphosoda preparation. A complete colonoscopy was defined as cecal intubation, which was identified by visualization of appendiceal hole. Colonoscopy examination was carried out during withdrawal of the scope. Informed consent was obtained from all patients prior to procedure. Conscious sedation was given by the Endoscopist assisted by an attending nurse or anesthesiologist using intravenous midazolam (mean dose 2.5 mg), hyoscine 20 mg and pentazocine 30 mg or pethidine 50 mg.

All polyps identified during colonoscopy were biopsied or removed endoscopically and submitted for histopathology. The location of the polyps were defined as recto-sigmoid (rectum and sigmoid colon) and proximal colon (from caecum to descending colon) on the assumption that sigmoidoscopy usually does not reach beyond the sigmoid-descending colon junction.<sup>[12,13]</sup> The polyp size was classified as small (<10 mm), medium (10-20 mm), or large (>20 mm). Estimation of polyp size was performed by the Endoscopist using the diameter of the open biopsy forceps, which is about 8 mm. In the event of multiple polyps, only the size of the largest was considered for the purposes of analysis. Grossly, the polyps were classified as pedunculated, semipedunculated or sessile.

For the purpose analysis, hyperplastic polyp, lipoma, lymphoid aggregates, or inflammatory polyp were classified as nonneoplastic polyps, while adenomatous polyps and malignant were classified as neoplastic polyps. Adenomatous polyps were referred to as nonmalignant neoplastic polyps while malignant polyps were classified as malignant neoplastic polyps. Familial adenomatous polyposis was defined as individual having more than 100 adenomatous polyps with histopathology finding of adenoma. Other patients with no polyps were regarded as normal. Microscopically, the adenomas were categorized architecturally as tubular, tubulovillous and villous. Degrees of dysplasia observed in the adenomas were graded as low (mild, moderate) or high grade (severe, including carcinoma *in situ*). ADR was defined as the number of colonoscopies in which one or more adenomas was detected, divided by the total number of colonoscopies performed by the endoscopist. PDR, defined as the number of colonoscopies in which one or more polyps were detected, biopsied and sent for histology, divided by the total number of colonoscopies performed by the gastroenterologist.

### Assessment of risk factors

With the aid of a structured proforma, gastrointestinal symptoms and risk status including current smoking habit (smoked regularly during the previous 12 months), alcohol consumption ( $\geq 70$  g/week or  $\geq 10$  g/day), and

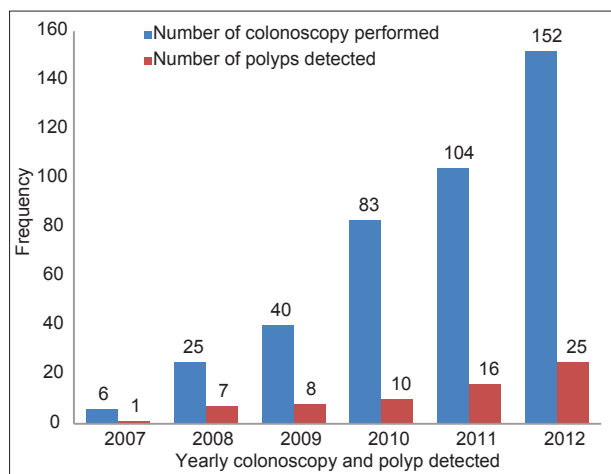
regular use of aspirin and/or nonsteroidal anti-inflammatory drugs (NSAIDs) were obtained for analysis. Other pieces of information obtained included family history of CRC and body mass index (BMI). BMI was calculated from measured weight and height, and categorized as normal ( $<25 \text{ kg/m}^2$ ), overweight ( $25\text{--}29.9 \text{ kg/m}^2$ ), or obese ( $\geq 30 \text{ kg/m}^2$ ) according to the World Health Organization classification. For the purpose of this study, patient with BMI above 25 were regarded as obese.

### Statistical analysis

Data analyzed include patient demographics, indications, colonoscopic findings, number of the polyps, size, possible risk factor, histopathological characteristics of the polyps as well as the PDR and ADR. Patients were stratified by age into two groups (Age  $< 50$  and  $\geq 50$  years) Categorical variables were expressed as numbers and percentages. Chi-square or Fisher's exact test, where appropriate, was used for analysis of categorical variables. Continuous variables were expressed as medians, or as means and standard deviation, as appropriate. Mann-Whitney and Fisher exact test were used to assess the differences. All analyses were performed using SPSS version 21.0 (SPSS INC, Chicago, IL, USA). A two-tailed  $P < 0.05$  was considered as statistically significant.

## Results

During the study period, 415 patients met the inclusion criteria for the study and only 67 patients had colonic polyps. The overall PDR in the study group was 16.1%. Figure 1 showed the yearly colonoscopy performed and annual polyp detected. The age range was 2–87 years with a mean of  $53.8 \pm 19.7$  years and a median of 57 years. Forty-three (64.2%) patients were 50 years or above. There were 40 (59.7%) males and 27 (40.3%) female in the study group. Over 70% of the patients had tertiary education.

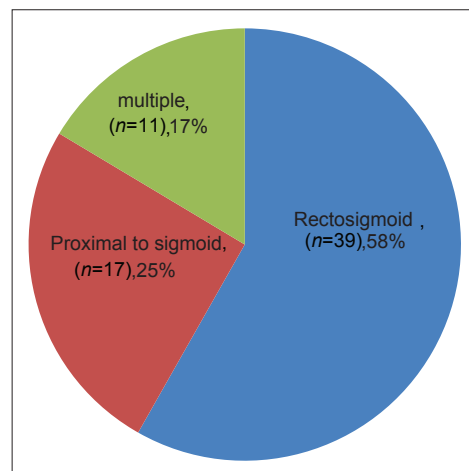


**Figure 1:** Number of colonoscopy performed and the polyps detected from 2007 to 2012

Thirty-three (49.3%) patients were referred as a result of lower gastrointestinal bleeding, 14 (20.9%) for suspicion of CRC and 13 (19.4%) for routine screening. Other referral diagnosis includes chronic diarrhea, left iliac fossa pain and intra-abdominal mass. There were no statistical differences in the referral diagnosis of patients younger than 50 years and those older than 50 years ( $P = 0.740$ ).

The location of the polyps was shown in Figure 2. Over half of patients (58.2%) had the polyps at the recto-sigmoid region of the colon, while 17 (25.4%) had the polyps located proximal to sigmoid colon. Eleven (11.4%) patients had multiple polyps involving both segment.

The histopathology results of 59 patients were available for analysis. As shown in Figure 3, 28 (47.5%) had adenomatous polyps. The ADR for our cohort was 6.8. Of these patients, two patients had FAP (familial study was not conducted) as they had more than 100 adenomatous polyps. Their ages were 32 and 45 years. The 45-year-old woman had malignant change at presentation. These patients also had multiple metastases to the liver and lungs on further evaluation. She was placed on chemotherapy but eventually died of the disease. The second patient was lost to follow up due to lack of fund for treatment. Of the remaining 26 patients with adenomatous polyps, 5 (19.2%) patients had tubular adenoma, 14 (53.9%) patients had tubulovillous adenoma, while 7 (26.9%) patients had villous adenoma. According to degree of dysplasia, nine (34.6%) patients had high grade, while 17 (65.4%) patients had low grade dysplasia. Figure 4a and b show the photomicrograph of a 75-year-old man with tubulovillous adenoma with low grade dysplasia. Seventeen (18.8%) patients had inflammatory polyps, 5 (8.5%) patient each had hyperplastic and malignant polyps, while 4 (6.8%) patients had juvenile polyps. Two of the juvenile polyps were polyposis as they had numerous polyps outlining the entire small and large intestine. These were confirmed histologically from biopsy taken from both upper and lower gastrointestinal endoscopy. The ages of



**Figure 2:** The distribution of the location of the polyps

the patients were 6 and 17 years. The 17-year-old patients had colonic resection. The picture of the resected colonic specimen was shown in Figure 5. The younger patient had two sessions of polypectomy and still on follow-up.

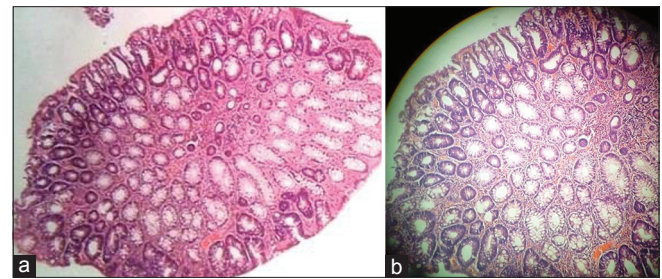
Apart from the four patients that had polyposis, a total of 78 polyps were identified (an average of 0.2 polyps per explored patients with a range of 1-4 polyps) were biopsied. Of these, 15 (19.2%) polyps were small, 58 (74.5%) were medium polyps and 5 (6.4%) were large polyps. Forty-two (53.8%) patients had pedunculated morphology, 23 (29.5%) had semi-pedunculated morphology and 13 (16.7%) had sessile morphology.

As shown in Figure 6, the patients aged 50 and above statistically significantly had more adenomatous and hyperplastic polyps than patients aged below 50 years ( $P = 0.010$ ). However, when the location of the polyps was compared with the age, this was not statistically significant ( $P = 0.419$ ). The histopathological type of the polyps was also compared with the location of the polyps as shown in Figure 7 and this was not statistically significant ( $P = 0.483$ ). In addition, the relationship of the histological type and sex of the patients was assessed and this was found not to be statistically significant ( $P = 0.381$ ). When the location of the polyps was compared with the sex distribution, this was also not statistically significant ( $P = 0.565$ ). Only four patients smoked cigarette and 5 patients gave history of significant

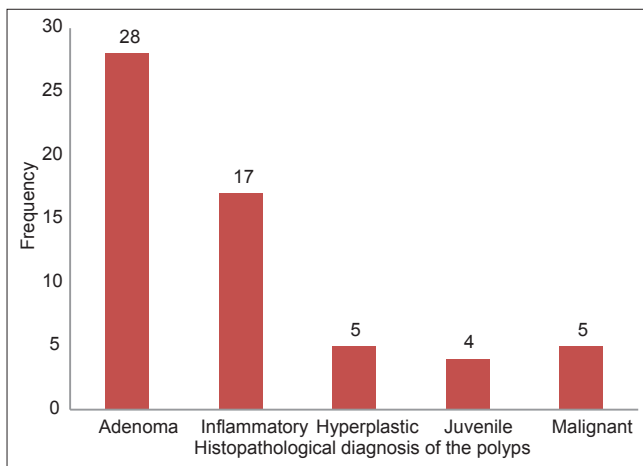
alcohol intake in our cohort. Seventeen (25.4%) patients were either overweight or obese among the study cohort. Types of polyps seen in obese and normal weight patients were presented in Figure 8. The BMI was found not to be statistically significant when compared with the histological type of the polyps ( $P = 0.052$ ). Only two patients gave family history of polyps and the patients had adenomatous polyps.

## Discussion

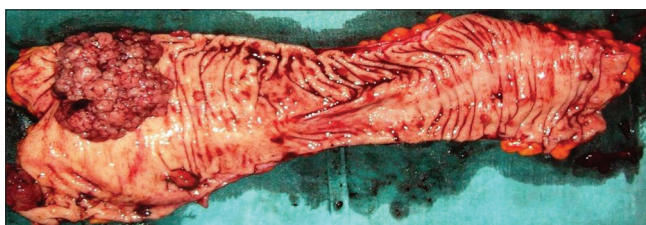
Colorectal polyps are believed to be rare among black Africans. Several hypotheses have been proposed to explain the rarity of this lesion from both autopsy and colonoscopy series.<sup>[14]</sup> Putative protective factors identified include a high carbohydrate malabsorption, low meat and animal fat intake, reduced mucosa cell proliferation, low fecal



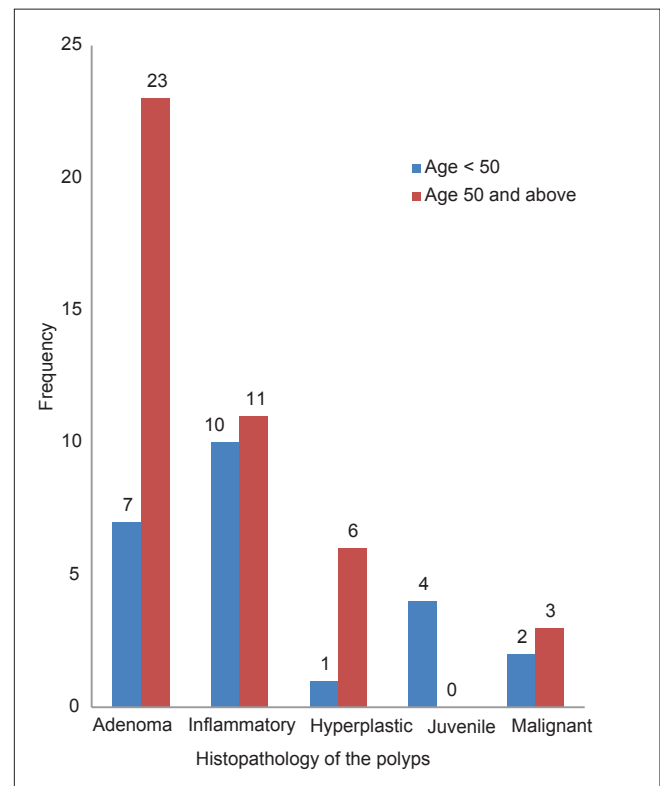
**Figure 4:** A photomicrograph of a tubular adenoma with moderate dysplasia found in a 75-year-old man



**Figure 3:** The histological diagnosis of the colonic polyps

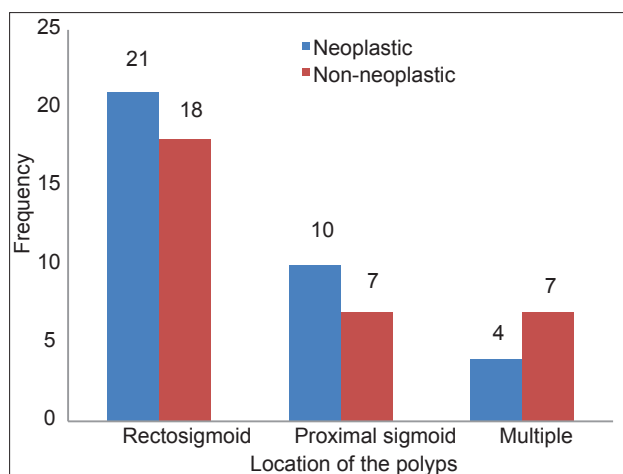


**Figure 5:** The picture of surgical specimen of a 17-year-old girl with juvenile polyposis



**Figure 6:** The age distribution and the histopathological diagnosis of patients with colonic polyps

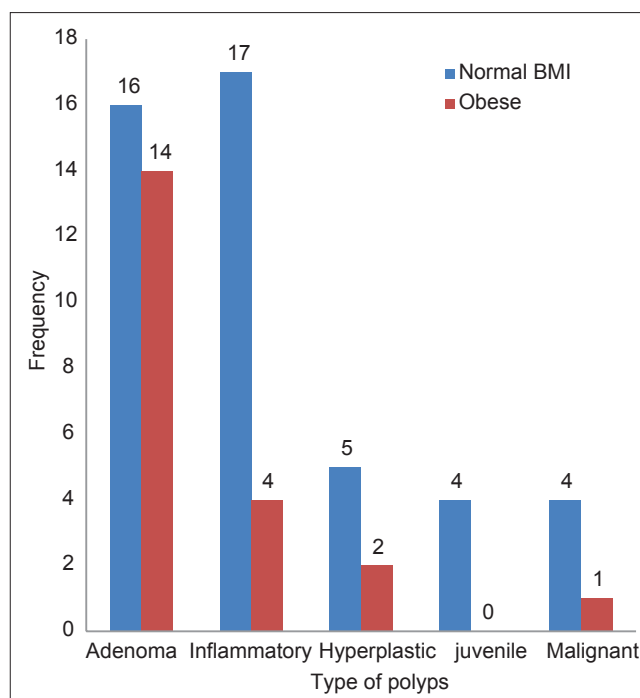




**Figure 7:** The relationship of the histological type and the location of the colonic polyps

pH and a different colonic microorganism ecosystem in black Africans.<sup>[8,9]</sup> Some of these factors are changing in Nigeria.<sup>[11]</sup> Our study showed that the PDR, ADR, and polyp per explored were 16.1, 6.8, 0.2 respectively. These rates, obtained in largely symptomatic patients, are low when compared to the figures from most western and some Asian countries. A recent large colonoscopy series from Spain quoted PDR of 45.8% and 0.97 polyp per explored patient.<sup>[15]</sup> Similar study from Mayo Clinic in United States of America revealed a mean PDR of 49% and mean ADR 31%.<sup>[16]</sup> Barret, et al.,<sup>[17]</sup> reviewed the colonoscopy national database in France and reported PDR of 35.5% and ADR of 17.7%. Among Korean patient aged 50-59 screened for adenoma, ADR of 32.8% was recorded, which was similar to report from among Americans.<sup>[18]</sup> A review of colonoscopy reports from 10 Asian countries comprising of 17 large endoscopy units revealed ADR of 14.8%.<sup>[19]</sup> However, our findings are similar to reports from Kuwait where PDR of 12.5 and ADR of 10% were reported.<sup>[20]</sup> A report from a private facility in Malaysia also quoted an ADR of 11.5%.<sup>[21]</sup> Among the Iranian, a PDR of 14.8% was recorded.<sup>[22]</sup> It is worth noting that earlier study among black African by Bremner and Ackerman<sup>[14]</sup> reported a total absence of adenoma in 14,000 necropsies. Only six adenomatous polyps were observed on surgical specimens among black African in South Africa.<sup>[14]</sup> In a similar study, among black and white South African patients, no adenoma was observed among the blacks, while seven cases of adenoma was observed in similar number of the whites.<sup>[9]</sup> A previous study from same center about two decades ago showed a PDR of 4.2%.<sup>[23]</sup>

The possible explanation for the apparent increase in PDR and ADR observed in our study may be increased urbanization and westernization of diet.<sup>[11]</sup> Another plausible reason may be due to the fact our cohort population are symptomatic at the time of the procedure. While this may be true, previous study by Blumenstein et al.,<sup>[24]</sup> who



**Figure 8:** The relationship of body mass index and the histopathological diagnosis of patients with colonic polyps

carried out a nationwide review of population based data of symptomatic and nonsymptomatic patients who were subjected to have colonoscopy done in Germany, he found that PDR and ADR were comparable in symptomatic and nonsymptomatic population. There finding suggest that PDR in symptomatic patient is a reflection of the prevalence of polyps in the population.

Several factors have been identified to influence PDR and ADR. These include withdrawal time and overall procedure time, patients' gender and age (over 50), the quality of bowel preparation, the level of Endoscopist' experience and expertise, the quality of the endoscopic devices, time of the day that the procedure was done and personal or family history of CRC.<sup>[25-33]</sup> We found that patients 50 years and above had statistically more polyps than younger patients. While this may suggest the possible age of commencement of screening colonoscopy in Nigeria, further study will be needed to substantiate this finding. It should be noted that the average age of occurrence of CRC in Nigeria is about a decade or more less than the average age of CRC in most western countries.<sup>[10]</sup> Since previous epidemiological studies and mathematical models on cost effectiveness suggest the age of commencement of colonoscopy screening in developed countries to be 50 years,<sup>[34-38]</sup> this may imply that it may be advisable to start screening for CRC earlier than 50 years.

Our study did not find any association between the age and the location of polyps. This is contrary to previous study that showed that incidence of right sided polyps increased

with increasing age.<sup>[37]</sup> The increasing prevalence of right colon polyps with age may be due to physiologic and genetic changes that accompany the aging process.<sup>[39]</sup>

This study also showed that only two-third of the polyps was found in the rectosigmoid region. The implication of this is that flexible sigmoidoscopy will perhaps miss a third of the lesions if it is used to evaluate patients in our environments. Similar to our findings, previous study had shown that flexible sigmoidoscopy will miss about 23% of CRC 38% of neoplastic polyps,<sup>[4]</sup> and this increase to 50% after the age of 70 years.<sup>[37,40,41]</sup> Despite the inherent advantage of sigmoidoscopy making it most suitable for our environment, it must be bore in mind that significant amount of polyps will be missed.<sup>[42-47]</sup>

We found that more male had polyps than females. However, we do not find any statistical relationship between the histopathologic type of the polyps and sex of our patients. Similarly, we do not find any statistical relationship between sex and location of the polyps. Previous studies had shown that men tend to have higher prevalence of colorectal polyp and when polyps occur in older women, it tend to be right-sided.<sup>[35,48]</sup> While reasons for low polyp rate in women are not known, plausible reasons include protective role of estrogen,<sup>[35,49]</sup> decreased secondary bile acid production,<sup>[50]</sup> and decreased serum levels of insulin-like growth factors in women.<sup>[51,52]</sup>

Several factors had been identified to predispose patients to colorectal polyps which include increasing age, cigarette smoking, high fat and low fiber diet, reduced physical activity and obesity.<sup>[3]</sup> In contrast, other factors such as intake of vitamin C, Calcium, folic acid and use of NSAID, had been found to prevent polyp formation and when it is formed, it can cause it to regress.<sup>[3,53]</sup> This study was limited in the fact that detail dietary assessment was not performed. Only very few patients had positive history of cigarette smoking. Most of the patients have borderline BMI and only few were obese. Further study will be needed to assess the possible risk factors for the development of colorectal polyps in Nigeria. Of all the risk factors, the relation of obesity and colorectal polyps is most studied. The purported mechanism is related to decrease of adipocytokines such as adiponectin and leptin.<sup>[54]</sup>

## Conclusion

The found rather higher overall and adenomatous polyps rates in our patient cohort when compared with previous reports from sub-Saharan Africa. Most of the polyps were identified in patients aged 50 years or older. A majority of the polyps were adenomatous. About two-third of the polyps were found on the rectosigmoid part of the colon. Our rather relatively significantly high PDR of 16.1% among our patients argues the need for an organized CRC screening

program among Nigerians, to mitigate a rising incidence of CRC in Nigeria.

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